

# Geng Niu

[gengniu.org](http://gengniu.org) ♦ [geng.niu@duke.edu](mailto:geng.niu@duke.edu) ♦ [Google Scholar](#) ♦ [LinkedIn](#)

Carbon Capture Utilization and Storage, 3D Printed Concrete

## EDUCATION

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### Duke University

- Ph.D. candidate in Civil and Environmental Engineering 2024 - present  
(Advisor: Prof. Laura E. Dalton)

### Southeast University, China

- M.S. in Material Science and Engineering 2021 - 2024
- B.S. in Material Science and Engineering 2017 - 2021

## RESEARCH EXPERIENCE

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### Dalton's Lab, Duke University

2024 - present

Advisor: Prof. Laura E. Dalton  
Research: Carbon Capture Utilization and Storage, 4D Imaging  
Project: 3D Printed Concrete for Subsea Environments (Funded by DARPA-Trenton)

### Jiangsu Key Laboratory of Construction Materials, Southeast University

2018 - 2024

Advisor: Prof. Yamei Zhang  
Research: 3D Printed Concrete, Low-density Concrete

## PUBLICATIONS

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### Journal Articles († indicates co-first author, \* indicates corresponding author)

1. Lutao Jia, Enlai Dong, Kailun Xia, **Geng Niu**, Zijian Jia, Hanquan Yuan, Yueyi Gao, Yamei Zhang\*. (2025). Initial plastic shrinkage of 3D-printed concrete incorporating recycled brick fine aggregates: Insights from water transport and structural evolution. *Journal of Building Engineering*, 106, 112665. [[doi](#)]
2. Lutao Jia, **Geng Niu**, Enlai Dong, Yifan Jiang, Xianggang Wang, Zijian Jia, Wei Wang, Yueyi Gao, Yamei Zhang\*. (2024). Optimization strategy for incorporating recycled brick powder in 3D-printed concrete by balancing low carbon footprint and enhanced performance. *Construction and Building Materials*, 443, 137801. [[doi](#)]
3. **Geng Niu**, Chao Liu, Lutao Jia, Lei Ma, Yifan Shi, Yifan Jiang, Zijian Jia, Yu Chen, Nemkumar Banthia, Yamei Zhang\*. (2024). Preparation and Performance Analysis of 3D Printed Lightweight EPS Concrete: Insights from the Excess Paste Theory. *Cement and Concrete Composites*, 149, 105509. [[doi](#)]
4. Lei Ma, Qing Zhang, Hélène Lombois-Burger, Zijian Jia, Zedi Zhang, **Geng Niu**, Yamei Zhang\*. (2022). Pore Structure, Internal Relative Humidity, and Fiber Orientation of 3D Printed Concrete with Polypropylene Fiber and Their Relation with Shrinkage. *Journal of Building Engineering*, 61, 105250. [[doi](#)]
5. Chao Liu, Yuning Chen, Zedi Zhang, **Geng Niu**, Yuanliang Xiong, Lei Ma, Qi Fu, Chun Chen, Nemkumar Banthia, Yamei Zhang\*. (2022). Study of the Influence of Sand on Rheological Properties, Bubble Features and Buildability of Fresh Foamed Concrete for 3D Printing. *Construction and Building Materials*, 356, 129292. [[doi](#)]

## Manuscripts Drafted and Under Preparation

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6. **Geng Niu**, Manolis Veveakis, Laura E. Dalton\*. (in prep). Mechanical Performance of Carbonated Olivine and Olivine Mortars.

## Contributed Conference Presentations (underline: presenter)

7. **Geng Niu**, Laura E. Dalton\*. (2026). Elastoplastic Behaviors of Mortar and Olivine Rock: A Triaxial Study. ACerS Cements 2026, 10-12 June, Coral Gables, Florida, USA.
8. **Geng Niu**, Laura E. Dalton\*. (2026). Elastoplastic Behavior of Mortar. 2026 SympoCEEum, 3 April, Durham, North Carolina, USA.
9. **Geng Niu**, Laura E. Dalton\*. (2025). Exploration of Carbon Capture in Mortar. InterPore2025, 19-22 May, Albuquerque, New Mexico, USA.
10. **Geng Niu**, Laura E. Dalton\*. (2025). Exploration of Carbon Capture in Mortar. 2025 SympoCEEum, 4-5 April, Durham, North Carolina, USA.

## HONORS & AWARDS

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- Chunmei Zhang Scholarship, Southeast University 2024
- First-Class Postgraduate Scholarship, Southeast University 2021
- Changwen Miao Scholarship, Southeast University 2019 - 2020

## PROFESSIONAL EXPERIENCES

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### Journal Reviewer

- Cement and Concrete Composites
- Construction and Building Materials
- ACI Materials Journal

### Teaching Assistant

- EGR 201L Mechanics of Solids, Duke University 2025
- Cement Chemistry, Southeast University 2022

### Equipment Operator & Data Analyst

- Anton Paar XRDynamic 500, X-Ray Diffractometer, Duke University 2025 - present
- SDT 650, Simultaneous thermal analyzer, Duke University 2025 - present
- TESCAN UniTOM XL, X-ray tomography scanner, Duke University 2025 - present
- Y.CT precision, X-ray tomography scanner, Southeast University 2022 - 2024
- Zeiss Xradia 510 Versa, 3D X-ray microscope, Southeast University 2022 - 2024

### Memberships

- American Society of Civil Engineers (ASCE) 2024 - present
- American Concrete Institute (ACI) 2024 - present
- The American Ceramics Society (ACerS) 2024 - present
- International Society for Porous Media (InterPore) 2024 - present

**Invited Talk**

**Book Chapters**

**Software Development**